HONOLULU

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SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - SEPTEMBER 1976

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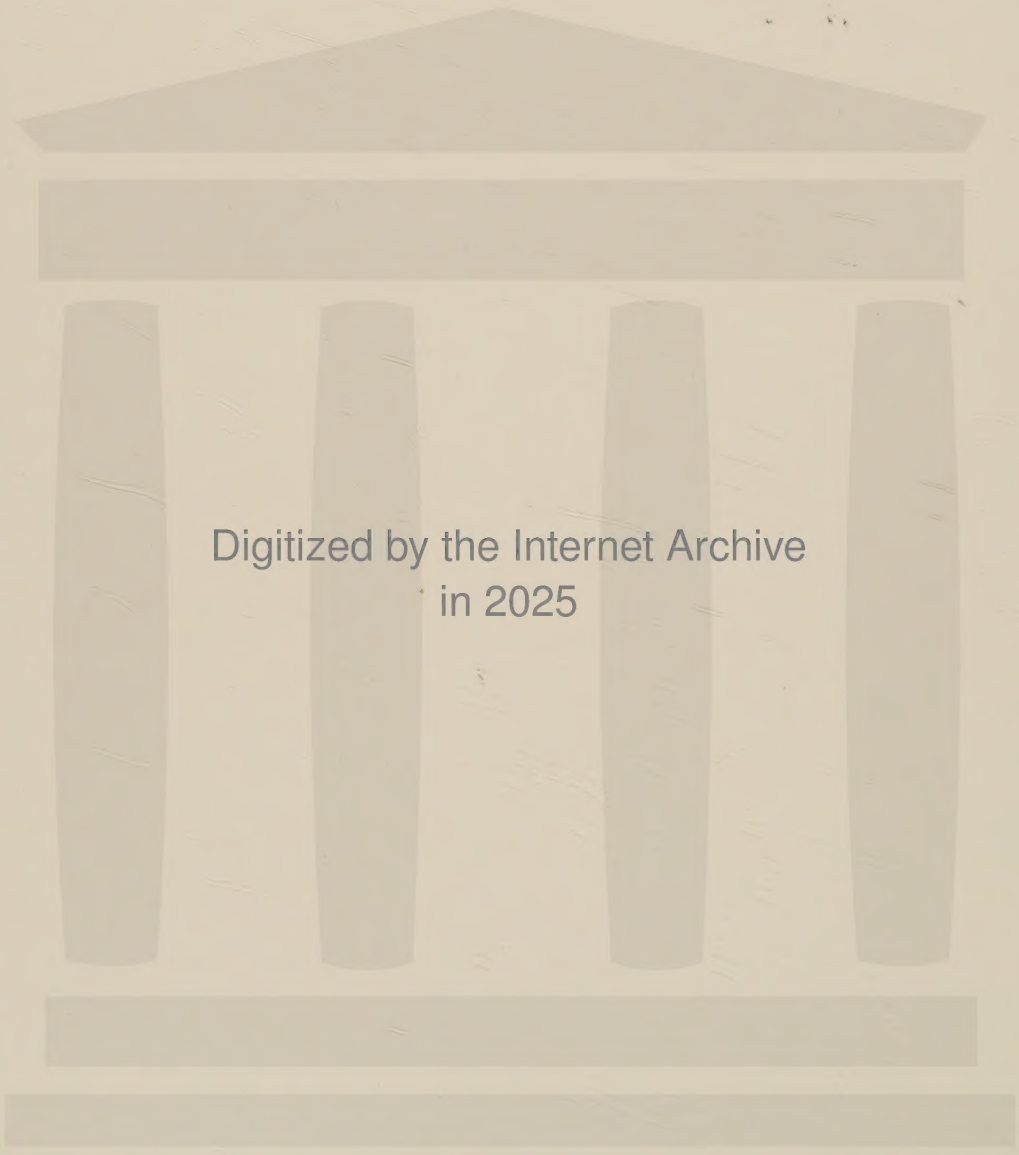
NOAA/NMFS



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SOUTHWEST FISHERIES CENTER
La Jolla, California

Honolulu Laboratory
La Jolla Laboratory
Tiburon Laboratory

MONTHLY REPORT - SEPTEMBER 1976

STATUS OF PUBLICATIONS

Published

Randall, John E., and Paul Struhsaker. 1976. Description of the male of the Hawaiian angelfish Genicanthus personatus. Bulletin of Marine Science, 26:414-416.

Only four female specimens were available for the description of the Hawaiian angelfish Genicanthus personatus by Randall (1975). Since the eight other species of the genus are all sexually dichromatic, the existence of a male of different color was predicted. Two male specimens of this species were recently trawled at a depth of 51 m near Nihoa Island in the Leeward Hawaiian Islands. They were light gray with a broad black band across the base of the caudal fin like the females, but in sharp contrast to the females, the front of the head and most of the pectoral, dorsal, and anal fins were yellow-orange. Also, the males were more elongate, the depth 2.1 in SL, and the caudal fin was lunate instead of emarginate due to a prolongation of the lobes of the fin.

Skillman, Robert A., and Marian Y. Y. Yong. 1976. Von Bertalanffy growth curves for striped marlin, Tetrapturus audax, and blue marlin, Makaira nigricans, in the central North Pacific Ocean. Fishery Bulletin, U.S. 74:553-566.

The growth of striped marlin, Tetrapturus audax, and blue marlin, Makaira nigricans, was described by fitting von Bertalanffy growth curves (an assumed age model and a length-increment model) to the progression of age-groups, by quarters, through the Hawaiian longline

fishery from 1960 to 1970. For striped marlin, the sexes grew at about the same rate and had similar predicted asymptotic maximum fork lengths, 277.4-314.4 cm for males and 288.7-326.2 cm for females. For blue marlin, the sexes grew at about the same rate until 250 cm. Above this length, the growth rate of males declined and an asymptotic maximum length of 298.8-368.0 cm was predicted. For females above 250 cm, the growth continued at a rapid rate, exhibiting little tendency toward an asymptote over the range of ages available to the study.

Hobson, E.S., and J.R. Chess. 1976. Trophic interactions among fishes and zooplankters nearshore at Santa Catalina Island, California. Fishery Bulletin, U.S. 74(3): 567-598.

Feeding relationships between fishes and zooplankters differ sharply between day and night. This paper describes these differences at Santa Catalina Island and discusses their ecological and evolutionary implications. Fishes that prey primarily on zooplankters during the day tend to be small-mouthed species adapted to take the small plankters (most less than 2 mm) which constitute the diurnal zooplankton. Fishes that prey primarily on zooplankters after dark tend to be large-mouthed species adapted to take the larger forms (most more than 3 mm) that rise into the water column at night after spending the day under shelter on or near the sea floor.

Korn, S.N., N. Kirsch, and J. Struhsaker. 1976. Uptake, distribution, and depuration of ^{14}C benzene in northern anchovy, Engraulis mordax, and striped bass, Morone saxatilis. Fishery Bulletin, U.S. 74(3): 545-551.

The uptake, description and depuration of water-soluble, monocyclic hydrocarbon contained in petroleum and refined products was studied in two species of marine fish. Mature northern anchovy, Engraulis mordax, and juvenile striped bass, Morone saxatilis, were exposed to sublethal concentrations of ^{14}C benzene for 48 h. Residues in tissues exhibiting a high lipid content or representing apparent major metabolic sites were measured during the exposure and afterwards when the fish were transferred to clean seawater. Fish exhibited a rapid uptake over a wide range of benzene concentrations in the water column. Accumulation in anchovy was considerably greater than in striped bass. Results indicate that the pathway of hydrocarbons through the liver, gallbladder, intestines, and colon is a major depuration route. Residues were depurated rapidly after cessation of exposure; in striped bass tissues most residues were undetectable by 7 days.

Approved by Center Director

Coan, Atilio L., and Robert C. Francis. "On Jensen's comparison of logistic equations for population growth". For publication in Biometrics (Article Review).

Ahlstrom, Elbert H., and H. Geoffrey Moser. "Eggs and larvae of fishes and their role in systematic investigations and in fisheries." For publication in Congres Europeen des Ichthyologistes (Proceedings) Museum d'Histoire Naturelle, Paris, France.

Smith, Paul E. "Biological effects of ocean variability: time and space scales of biological responses." For publication in the Proceedings of a special symposium on "Biological effects of ocean variability" of the Joint Oceanographic Assembly, Edinburgh, Scotland, September 1976.

Smith, Paul E. and Reuben Lasker. "Position of larval fish in an ecosystem." For publication in the Proceedings of a special symposium on "Biological effects on ocean variability" of the Joint Oceanographic Assembly, Edinburgh, Scotland, September 1976.

Lasker, Reuben. "Ocean variability and its biological effects: Regional review - Northeast Pacific." For publication in the Proceedings of a special symposium on "Biological effects of ocean variability" of the Joint Oceanographic Assembly, Edinburgh, Scotland, September 1976.

Arthur, David K. "Distribution, size and abundance of microcopepods in the California Current system and their influence on survival and feeding tactics of marine teleost larvae." For publication in the Fishery Bulletin, U.S.

EXTENDED JURISDICTION

Fisheries Panels Briefed at Washington Meeting

Acting SWFC Director, Izadore Barrett; Richard Shomura, Director of the Honolulu Laboratory; and David Mackett, Planning Officer, attended a national conference in Arlington, Virginia, September 13 to 17, to brief members of the Regional Fishery Management Councils on the management of the U.S. 200-mile fishery conservation zone.

The Regional Fishery Management Councils, established by the Fisheries Conservation and Management Act of 1976, are the basic tool for management of America's fisheries within the 200-mile zone, also established by the Act.

According to Mr. Barrett, the Council members were briefed on such items as their responsibilities, authorities and duties under the Act; their relationships to NMFS regional and central offices; and legal requirements and administrative arrangements for budgeting, organization and staffing. One session was devoted to aspects of foreign fishing under U.S. jurisdiction, including the role of the Councils, and the Department of Commerce, and Coast Guard enforcement duties.

HONOLULU LABORATORY

FISH-ENVIRONMENT INVESTIGATIONS

Experiments Continue on Olfactory Responses of Yellowfin Tuna

Research is currently underway, at the Honolulu Laboratory, to determine if tunas respond to olfactory cues to an extent that it would be possible to separate yellowfin tuna from porpoises by chemosensory behavioral modification. Bioassays are being made of the effects of prey scents on the swimming and feeding behavior of captive tuna. To date, responses have been observed to a variety of sea water rinses from prey organisms, porpoise excrete, and chemically altered natural odors.

During September, videotape equipment was purchased and adapted to replace the borrowed system which was unexpectedly recalled. The gear has proven to be invaluable in the demonstration and analysis of the behavior under test. Rapid and immediate review of the test sessions would not be possible with movie film.

Data collection is consequently continuing at a rapid pace. Forty-eight extract tests have now been completed. Of these, 26 have been quantitatively analyzed by observing the videotape (see accompanying table) and comparing pre- and post-odorant behavior.

Dr. Clair Folsome and Mr. Andrew Britten (Department of Chemistry, University of Hawaii), have supplied samples of nehu, Stolephorus purpureus, extract from which all of the volatile components have been removed. These treated extracts were very effective, indicating that the active constituents would likely be nitrogenous rather than lipidic. A quantitative analysis of the standard nehu extract is now underway and the results should be soon available. If the major constituent compounds of the nehu extract are not available, then synthetic mixtures will be tested.

Results of extract tests quantitatively analysed by videotape observations comparing pre- and post-odorant behavior

Extracts	Tests completed	Tests analyzed	Analyzed responses			Qualitative observations
			Strong	Mild	None	
Nehu (stock)	15	10	9	1	0	Strong
Nehu (dilute, 1:100)	3	2	1	0	1	Mild
Nehu (dilute, 1:1,000)	2	2	1	1	0	Mild
Squid	4	0	--	--	--	Mild
Decapterus sp.	5	3	2	1	0	Weak
Engraulidae	4	0	--	--	--	None
Osmeridae	2	2	2	0	0	Strong
Trachurops sp.	3	3	0	2	1	Weak
Porpoise tank water	2	0	--	--	--	None
Porpoise excreta	2	0	--	--	--	Mild to strong
Devolatilized nehu stock	5	3	3	0	0	Strong
Control	1	1	0	0	1	None

Dr. Jelle Atema has undertaken some anatomical studies of the yellowfin tuna brain, olfactory rosette, and associated pathways. Yellowfin tuna do have a well-developed olfactory apparatus indicating that it is an important sensory modality.

Studies Being Conducted to Determine Heat Loss Via Gills

In any model of body temperature of skipjack tuna, the proportion of heat loss via the body surface versus the gills is an important parameter. Measurements of heat loss over the body surface of a restrained skipjack tuna could account for only 20 to 40% of heat production based upon oxygen consumption rates. We concluded that the gills must represent a significant route of heat loss.

Last month, experiments were conducted at the Honolulu Laboratory to determine the amount of heat loss at the gills. Assuming that any residual heat in the ventral aorta will be totally dissipated at the respiratory surfaces, heat loss at the gills must equal cardiac output times specific heat of the blood times temperature excess of the blood in the ventral aorta. Ambient temperature, ventral aorta blood temperature, and red muscle temperature were measured with fine thermistors. Cardiac output was determined by the Fick principle.

Based on three fish, the average cardiac output was approximately 90 ml $min^{-1}kg^{-1}$ and the average excess temperature in the ventral aorta was approximately 0.15°C. Thus, 75% of the heat generated by a restrained, quiescent fish is at the gills. More work is planned.

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The volume of swim speed/temperature data continues to be reduced into a more manageable form. From a cursory inspection of the data, there seems to be a small but significant temperature effect on swim speed and behavioral indications of perception of slowly changing temperature.

Preliminary planning is underway for a swimming-type respirometer. Construction plans have been obtained from Dr. J. R. Brett (Fisheries Research Board of Canada, Nanaimo, B.C.) and cost estimates are being made.

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TUNA ASSESSMENT AND DEVELOPMENT INVESTIGATIONS

Discussions Continue on Cooperative Interagency Northwestern Hawaiian Islands Study

Dr. Robert Skillman, Leader of the Tuna Monitoring and Assessment Task at the Honolulu Laboratory, as coordinator of the Northwestern Hawaiian Islands (NWHI) study, was involved this month primarily with activities connected with his coordinator's role. He held discussions with personnel from the Hawaii Division of Fish and Game (HDFG), the U.S. Fish and Wildlife Service (USFWS), and other parties relative to the draft prospectus for the study and more detailed research plans proposed by the cooperating agencies. Dr. Skillman also held discussions on the NWHI study with Mr. David Mackett, Planning Officer for the Southwest Fisheries Center (SWFC), and members of the Honolulu Laboratory (HL) staff, including Messrs. Tamio Otsu, Richard Uchida, Thomas Hida, and Ray Sumida. These discussions included a review of the overall plans for the cooperative interagency study, particularly scoping out in detail the Honolulu Laboratory's segment of the study. The latter involved developing a resource management program for the NWHI area, a detailed plan for the Honolulu Laboratory's field surveys, and a data management system for the data that will be generated by the study.

Preliminary Management Plans for Key Fishery Management Units Under Extended Jurisdiction Completed

Dr. Jerry Wetherall, Leader of the Population Dynamics Task at Honolulu completed the final of three preliminary management plans (PMP) which included plans for the Pacific billfishes, precious corals, and the seamount fishery resources. The working drafts of the PMP's were distributed for comment to key people in various agencies and also to people in the recreational and commercial fisheries. During the month Laboratory Director Richard Shomura and Dr. Wetherall convened a meeting at the Laboratory to discuss informally the working draft of the PMP for precious corals. Dr. Wetherall has been making revisions to the PMP's as comments are received from the various key people with interests in the PMP's.

TADI Personnel Prepare for Next Northwestern Hawaiian Islands (NWHI) Cruise

Fishery Biologist Thomas Hida of the Honolulu Laboratory was named Chief Scientist for the forthcoming Townsend Cromwell cruise (TC-76-06-73) to the NWHI. Mr. Hida and Research Assistants Paul Shiota and James Uchiyama were involved in making preparations for the cruise including purchasing supplies and assembling trawling and other biological sampling gear for the cruise. The objectives of the cruise

include conducting bottom fish trawling, fish and lobster trapping, handlining, and sampling midwater forage organisms at selected insular sites in the NWHI. Oceanographic observations which will tie in with the biological sampling will also be made. The first and last few days of the Townsend Cromwell cruise will be taken over by personnel of the Fish-Environment Investigations to continue work on sonic tracking of skipjack tuna.

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TADI Chief Tamio Otsu reported the capture of two tagged skipjack tuna during the month. One of the fish weighing 20 pounds (9.1 kg) was caught by the Hawaiian aku boat Buccaneer at about latitude 21°00'N, longitude 158°00'W. The other fish which weighed about 20.8 pounds (9.4 kg) was caught by the Sea Queen at about latitude 21°00'N, longitude 157°00'W. According to information supplied by Dr. William Bayliff of the Inter-American Tropical Tuna Commission in La Jolla, California, one fish was tagged on July 6, 1975 at latitude 24°07'N, longitude 113°45'W and was 59 cm (approximately 9.8 pounds or 4.4 kg) when released and the other was tagged on July 20, 1975 at latitude 21°25'N, longitude 110°36'W and was 45 cm (or approximately 3.9 pounds or 1.8 kg) when released.

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Mr. Richard Uchida, Fishery Biologist at the Honolulu Laboratory initiated a library search for published catch data and results of commercial and exploratory fishing from countries presently harvesting marine fishes, crustaceans, and mollusks in the western central Pacific and Indian Oceans. With assistance from Mrs. Sally Kuba, the catches of several important species and species groups found in these areas have been plotted for the years 1965-74. This report is being prepared in connection with the updating of previously published FAO reports. Mr. Uchida also joined with TADI Chief Tamio Otsu in a discussion of problems associated with developing fisheries in South Pacific Islands with Messrs. Ian D. Richardson and A.D. Insull of Fisheries Development Limited, London, England, who have been contracted by the British government to do an assessment of the fishery development potential in the Ellice Islands (Tuvalu).

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Honolulu Laboratory Fishery Biologist Howard Yoshida worked on the preparation of a "country statement" which describes developments in fisheries in the U.S. in 1974-75, for the forthcoming 17th Session of the Indo-Pacific Fisheries Council (IPFC). It is the usual practice for member countries of the IPFC to prepare a country statement which summarizes significant developments in fisheries in member countries. Laboratory Director Shomura will be one of the official U.S. delegates to the IPFC meeting.

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Mr. James Uchiyama and Ms. Marian Yong, Mathematician, developed a display around the Laboratory's Wang 700 calculator for the Honolulu Laboratory's open house that was held from September 30 to October 2. The Wang calculator was programmed to provide the open house visitor with the age of striped marlin, blue marlin, mahimahi, and skipjack tuna, given the length or weight of the fish.

Under the direction of Dr. Robert Skillman, Ms. Yong has also been rewriting computer programs that are used to analyze landing data for the albacore longline fishing fleet based in American Samoa. As many as six programs have been combined into a single program that yields a more efficient and usable output while saving both time and money.

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Operations Research Analyst Roy Mendelssohn worked on manuscripts including one presented at the Lake Arrowhead Tuna Conference from September 26 to 29. Mr. Mendelssohn, Dr. Skillman, and Dr. Wetherall from the Honolulu Laboratory attended the Tuna Conference.

Hawaiian Skipjack Tuna Catches From August 23 to September 19 Continue Below Long-Term Average

The August 23 to September 19 catch of skipjack was estimated at 296.6 MT (metric tons), which is 49.2 MT above the 1975 catch for the same period but 157.1 MT below the 1948-75 long-term average. The catch from January through September 19 was estimated at 2,938.1 MT, which is 975.6 MT above last year's catch for the same period but 527.3 MT below the 1948-75 long-term average.

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Pulou Niuatoa, employee of the Government of American Samoa, recorded the lengths of 1,742 albacore from 35 vessels during the period August 14 to September 17. He also collected 35 sets of catch and effort data. Research Assistant Ray Sumida, utilizing data from five vessels, calculated an average size of 92.7 cm and a catch rate of 2.43 albacore per 100 hooks.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

ALBACORE FISHERIES PROGRAM

Coastal Range of Favorable Albacore Fishing Shrinks in September

According to R. Nishimoto, Fishery Biologist at the La Jolla Laboratory, the coastal range of favorable albacore fishing began to shrink in September. Fishing was especially poor off the Pacific Northwest. Fishing near Guadalupe Island also slowed as ocean temperature increased above albacore preference levels. At mid-month top catches reached 1,000 per day off northern California while other areas had top scores of 250 and averaged 20 to 80 fish per day. Winds and weather interrupted fishing at mid-month and again near the end of the month.

Four jig-fishing vessels on charter to the American Fishermen's Research Foundation, two of which had a NMFS observer aboard, scouted in regions from the Queen Charlotte Islands to Guadalupe Island. Effort was concentrated outside of regions where the commercial fleet was operating. Overall the fishing was very slow. Few fish were taken off the northern states; best scores were made off central California but these did not exceed an occasional 50 fish per day. In one offshore pass from San Diego to San Francisco a charter vessel found fish each day with scores ranging from 22 to 63 fish per day.

Sportboat catches were very good off San Diego in September. Daily catches ranged from less than one fish per passenger to nearly 5 fish per passenger on large fish of mostly 17 to 25 pounds.

The staff of Albacore Investigations worked on reducing the mass of data collected on the albacore oceanography cruise and the catch data from the cooperating AFRF charter vessels.

Anchovy Larvae Evaluated by Mircoscope Examination; None Found in Starving Condition

Most of the anchovy larvae collected at sea last March for the study of starvation have now been evaluated by microscope examination, according to Dr. C. O'Connell, Fishery Biologist at the La Jolla Laboratory. On the basis of histological criteria previously established by laboratory experiments, none of the larvae taken at sea, within a few miles of the coast, showed signs of severe emaciation indicative of the starving condition. However, 8 of the approximately 100 specimens examined showed histological deviations suggesting low vitality.

Although most of the larvae were collected between 1700 hours and midnight, certain changes related to the feeding cycle were apparent. From 1700 to 1800 food was generally present in the digestive tract, the pancreas was considerably depleted of zymogen, hindgut mucosa cells had large accumulations of material presumed to be protein extracted from food organisms, and livers showed signs of slight to moderate vacuolization. After 1900, digestive tracts were empty. After 2000 pancreatic zymogen had been replenished, hindgut accumulations had undergone some reduction by intracellular digestion, and vacuolization of the liver had increased markedly. Many of the larvae also showed a high incidence of mitotic figures in the digestive tract mucosa after 2000.

The eight questionable larvae had pancreases and/or livers well below the general level in zymogen content and vacuolization, respectively. A few of them also showed signs of mild emaciation of the trunk musculature. One of the larvae was taken alone at a low temperature (13°C, where all others were from 15°C water) and showed signs of low cell metabolism, though not of degeneration, in all tissues. Another relatively large individual (12.8 mm), in addition to the substandard pancreas and liver, had an atrophied gas bladder and severe degeneration of the digestive tract. Whatever the causes of their difficulties, these two larvae were probably doomed. The other six were probably not, but their condition suggests a degree of debilitation that could make them more vulnerable to predation than the majority. It is not clear whether or to what extent insufficient food intake contributed to the substandard condition of these eight larvae.

STOCK AND RECRUITMENT PROGRAM

Jack Mackerel Larvae Studied to Establish Morphological Criteria for Starving Conditions

Ms. Gail Theilacker and Mr. Jack Metoyer of the La Jolla Laboratory are continuing to study jack mackerel larvae in order to establish morphological and histological criteria which can be used to discriminate between healthy and starving larvae. Ultimately, these techniques can be used to assess the condition of sea-caught larvae, determine the suitability of feeding areas and possibly estimate the strength of a year class.

A study of field larvae was initiated. Larvae which were sorted from CalCOFI samples were submitted to histological analyses. The appearance of the larval tissues was different from that of laboratory reared larvae and they could not be graded as usual.

It is well known that tissue must be preserved quickly to prevent autolysis. It seemed reasonable, knowing that the time taken to preserve net samples was much longer than laboratory samples, to suspect that autolysis may be the cause of the unclear appearance of the tissues in the CalCOFI samples.

To test this, laboratory-reared larvae were sampled and preserved as usual. This sample was compared to a netted sample in which a group of larvae was preserved when the heart stopped and then at 5 minute intervals. Only the control could be graded histologically. The larvae that were sampled at death (10 minutes after netting) and all subsequent samples were reminiscent of the CalCOFI larvae. Jack mackerel larvae must be preserved in less than 10 minutes after capture if they are to be analyzed histologically; the exact time interval will be determined.

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Dr. Hunter and Ms. Sanchez report that work on oxygen consumption of Pacific mackerel at 22° and 18°C was completed this month and work is now underway at the 16°C temperature. Preliminary analysis of the data indicate that mackerel larvae have about twice the respiratory rate of anchovy larvae.

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Dr. Hunter reports that Mr. Harold Dorr has completed analysis of the laboratory data on the relation between maximum stomach volume and length in adult anchovy. This relationship will be used to express the degree of fullness of the stomachs of adult anchovy caught on the spawning grounds and evaluated for incidence of cannibalism.

"Electivity Index" Calculated for Several Species of Larval Fish Food Organisms in New York Bight

Dr. Edward Scura, Physiologist assisted by Ms. Kathleen Dorsey of the La Jolla Laboratory, continued analyzing samples and data collected during a June cruise on board the R/V Onrust in the New York Bight. The purpose of this cruise was to monitor the temporal and spatial distribution of potential larval fish food organisms and to establish feeding criteria for first-feeding scup larvae (Stenotomus shrysops) with ship-board bioassay techniques. An in situ particle-counting and pumping system was used to collect sea water from various depths where high concentrations of potential larval food organisms were detected. These samples were preserved for detailed microscopic examination in the laboratory and were also used for shipboard feeding experiments with laboratory-produced scup larvae.

An "electivity index" which is an indicator of food preference, was calculated for several species of food organisms by comparing the concentration of the food organism available in the sea water samples to the gut contents of the scup larvae used in the feeding experiments. One unusual finding of this study is that scup larvae show a preference for pollen from pine trees. Pine pollen grains were found in 21 of the 35 sea water samples used for feeding experiments at concentrations ranging from 0.01 to 0.04 grains/ml. Even at these low concentrations, in eight of the experiments, 7 to 100% of the feeding scup larvae ate pollen grains. The pollen had an average size of approximately 40 to 70 μm which is ideal for first-feeding scup larvae and, although nothing is known about the nutritional value of this food, it cannot be dismissed as a source of nutrition for fish larvae.

Anchovy/Sportfish Interaction Cruise
Completed on Jordan

On July 12, the David Starr Jordan left San Diego to begin an anchovy/sportfish interaction cruise to assess the degree of co-occurrence of northern anchovies and important recreational fish species in a section of the Los Angeles Bight, to correlate the movement of centers of anchovy abundance to the catch of predator species and to set the above studies in the context of the biological and physical ocean environment prevailing at the time.

The role of the Jordan was to determine anchovy abundance by acoustically mapping fish schools and to conduct biological sampling in the upper 70 m while Mr. Squire, of the La Jolla Laboratory, conducted aerial fish spotting surveys and determined the distribution and number of sportfishing boats in the survey area (details of the latter operation are given below). Although the voluminous data obtained during this cruise, which ended on September 3, are not yet analyzed, it appears that fish schools seen with the sonar were most likely juvenile jack mackerel. Mr. Squire's observations showed that at times anchovy schools were concentrated inside the 10 fm line where most of the sportfishing is done. Thus the available data indicate that there was plentiful forage fish for sportfish in areas and at times where there was sportfishing activity in the Bight.

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As part of the preliminary anchovy-interaction study conducted by the Southwest Fisheries Center and the California Department of Fish and Game during the period July 12 through September 5, 1976, 14 aerial surveys were conducted from NMFS-chartered aircraft by Fishery Biologist/Pilot James Squire of the La Jolla Laboratory to determine the geographical positions of both private and commercial (party boats) boats along the southern California coast. The surveys were conducted along the coast from north of Oceanside to west of Point Dume, California.

The number of sportfishing boats fishing the coast from the Barn Kelp, north of Oceanside, to west of Point Dume averaged 67 private boats and 10 commercial party boats per survey on weekdays, and 220 private boats and 17 commercial party boats per survey on weekends.

The approximate geographical position of the sportfishing boats were noted and an analysis of water depth in which the boats were fishing was made with these points. The depth of water over which the coastal sportboat fleet fishes is generally shallow, with a calculated average depth of 9.3 fm based on the midpoints of depths observed.

Most fishing during the survey was near the coast kelp bed areas with certain areas consistently fished. The distance from a harbor was important since fewer and larger boats fish the distant areas.

In addition eight survey flights were conducted for the specific purpose of locating anchovy schools in the nearshore areas between Oceanside to approximately 6 miles west of Point Dume, California, and to about 3 miles offshore, during daylight hours.

The amount of fish observed on any one day was highly variable, from a few schools on some days to massive amounts on others. On days when the schools were highly visible, most coastal areas within the survey area showed sizeable concentrations. Near-surface anchovy schools were consistently seen in the nearshore area west of the Newport Bay jetty; schools were sighted in this area on every survey.

The total tonnage of anchovies observed during the eight survey flights was estimated to be 6,700 tons. Data for 513 schools observed gave an estimate of average school size of about 13 tons.

ECOLOGY OF THE CALIFORNIA CURRENT

Contract Slated to Study Economics of Anchovy and Jack Mackerel Fisheries off California Coast

During September, Drs. Huppert and Stauffer of the La Jolla Laboratory assisted by the Contract Officer at the Northwest Administrative Service Office in Seattle, reviewed bids for a contract to study the economics of the anchovy and jack mackerel fisheries off the California coast. In particular the contractor is to 1) update the Perrin and Noetzel (1970) study of the San Pedro wetfish fleet, 2) determine the feasibility of using midwater trawl gear for harvesting jack mackerel, and 3) generally assess the economic feasibility of an expanded fishery for both jack mackerel and anchovy in the offshore area. The contract was awarded to Earl R. Combs, Consultants in Economics and Planning, Mercer Island, Washington.

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Dr. Stauffer contributed several days to work on the Pacific Billfish Preliminary Management Plan. First-cut population assessments for various billfish populations were conducted by Drs. Stauffer and Wetherall. Dr. Huppert assisted in writing the sections on socio-economic factors and optimality.

During the second half of September Dr. Huppert spent most of his time at various fisheries-related meetings. During September 15-17, he attended the second annual meeting of the Western Association for Valuation of Ecosystems (WAVE), an organization of agency and university economists and biologists of which Dr. Huppert is the current Secretary/Treasurer.

Contractor Submits Report on Use of Broad-Band Acoustic Source for Remote Estimation of Fish Size

Drs. Paul Smith and Reuben Lasker at the La Jolla Laboratory received a report from Tracor Inc. on the use of a broad-band acoustic source for the remote estimation of fish size and its repetitive use to estimate growth in a population of fish. The report, authored by contractor Dr. Van Holliday, concerns the routine survey of fish to determine mean fish size and changes in mean fish size. This technical project used acoustic data to design the processing procedure for an ensuing contract to gather new data at sea and to add a fish-sizing procedure to the operational sonar mapping project. Eventually, sonar mapping surveys will yield continuous data on the abundance of fish schools per unit area, their size, the size of the fish within the school, and an estimate of compaction within the school. These data will be combined with direct samples of fish and photographs of fish to allow the description of the major fish populations in sufficient detail to improve precision in the spawning biomass estimates of northern anchovy.

Senior Scientist Presents Invited Talk at Second European Ichthyological Congress

Dr. Elbert H. Ahlstrom, Senior Scientist at the La Jolla Laboratory, presented a talk at the invitation of the Second European Ichthyological Congress during the plenary session in Paris, France on September 9. His talk, a joint contribution with Dr. H.G. Moser and titled, "Eggs and larvae of fishes and their role in systematic investigations and in fisheries," was delivered before 200 ichthyologists from a spectrum of countries. Dr. Ahlstrom was the only representative from North America invited to give a lecture at these sessions; one of six world-famed ichthyologists selected for this honor.

Following the meetings, Dr. Ahlstrom visited the Institut Scientifique et Technique des Peches Maritimes, just outside of Nantes, and the Centre Oceanologique de Bretagne in Brest. The latter is a large center with a number of buildings spread over a considerable area. One of Dr. Ahlstrom's guides was Dr. Jean Yves LeGall who was one of the participants in a tuna larvae workshop in Honolulu in which Dr. Ahlstrom also was involved. One of the facilities in Brest was a model basin, similar to the David Taylor Model Basin in the Washington, D.C. area, but smaller. The Center also had extensive facilities for rearing fish.

Later the same day Dr. Ahlstrom visited the "Station Biologique" at Roscoff. This station, connected with the University of Paris, was founded in 1871 and conducts unrestricted research on general marine biology.

Oceanic Fisheries Resources Division

TUNA RESOURCES PROGRAM

Preparations for Upcoming ICCAT Meeting Completed

Dr. Gary Sakagawa, Leader of the Tuna Resources Program at the La Jolla Laboratory, reports that preparation of documents by staff members for the November 10 to 16 meeting in Madrid of the Standing Committee on Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT) is proceeding on schedule. Seven documents have been completed thus far:

1. "Length and age composition of yellowfin tuna from the Atlantic Ocean, 1966-1975" by Atilio L. Coan.

2. "A production analysis of the status of yellowfin tuna in the Atlantic Ocean, 1964-1975" by Atilio Coan and William Fox, Jr.

3. "Factors affecting tuna purse seine fishing effort" by Paul R. Greenblatt.

4. "A review and evaluation of estimates of natural mortality rates of tunas" by Ted C. Murphy and Gary T. Sakagawa.

5. "State of the bigeye tuna stocks of the Atlantic Ocean from production model analysis, 1957-1975" by Gary Sakagawa.

6. "Incidental catches made by American tuna seiners in the Atlantic Ocean, 1968-1975" by Gary Sakagawa.

7. "Size and species composition of Atlantic tunas in import landings of Puerto Rico, 1975-1976" by Gary Sakagawa, Atilio Coan and Eugene P. Holzapfel.

The documents have been submitted to ICCAT for distribution to ICCAT scientists for review and evaluation prior to the meeting. Three more documents are in the process of being assembled and are scheduled to be ready by November 1.

Staff members of the Program are also involved in coordinating certain activities that involve research on Atlantic tunas. For example, documents submitted to ICCAT by U.S. scientists at the Southeast Fisheries Center, Miami Laboratory and Woods Hole Oceanographic Institute are monitored by the staff. Staff members are responsible for coordinating the preparation of a status report on U.S. fisheries and research activities on Atlantic tunas and tuna-like fishes for ICCAT. The first phase of research activities of ICCAT's Working Group for an Atlantic-wide Skipjack Tuna Research Program is being coordinated by Dr. William Fox, Chief of the Oceanic Fisheries Resources Division.

Publication of August Issue of "Fishing Information" Delayed

Mr. Jim Renner, Fishery Biologist at the La Jolla Laboratory, reports that the August issue of Fishing Information will not go to press until sometime in early October due to delays in typing and drafting of the base copy. Distribution of the August issue will begin as soon as press runs are completed.

Mr. Renner also reports that conversion of the monthly long-term means of sea surface temperature for the Pacific Ocean from Fahrenheit to Celsius is in progress. When completed, mean sea surface temperature charts in Fishing Information will be reported in Celsius scale.

Drafts of Paper on Remote Sensing Completed

Mr. R. Evans, Oceanographer at the La Jolla Laboratory, completed the first draft of a manuscript entitled "Remote sensing - with applications to the exploitation and management of Atlantic tuna stocks." The manuscript deals with the current applications of remotely sensed environmental data to the problems of fishermen and resource managers. The paper is to be presented at the annual meeting of the International Commission for the Conservation of Atlantic Tunas being held in Madrid, Spain in November.

Paper Presented at Tuna Conference

Mr. Evans presented a talk at the 27th Annual Tuna Conference in Lake Arrowhead entitled "Recent empirical research on environmental determinants of tuna catch," which was based on a joint study conducted by Meteorologist Nathan Clark of the La Jolla Laboratory and Meteorologist Forrest Miller of the Inter-American Tropical Tuna Commission. The talk dealt with the use of environmental data in predicting fishing success in the eastern tropical Pacific tuna purse seine fishery. Results with regression analysis show marked differences in the effects of environmental variables on average catch per day's fishing (CPUE) among areas, among years, and among months. The environmental values accounted for 19 to 73% of the CPUE.

Tuna Vessels Participate in Fisheries Service FAX Program

During September, 19 U.S. tropical tuna vessels participated in the FAX program of the La Jolla Laboratory.

	Weather observations	XBT observations	Total	Total year to date
1975	143	29	172	3,380
1976	154	0	154	2,313
Percent change	+7.7	-	-10.5	-31.6

The tuna seiner, Santa Rosa, led all cooperating vessels in September with 25 weather observations sent to the Southwest Fisheries Center via radio station WWD. The Santa Rosa's reports comprised 16.2% of the total number sent in; congratulations are due to Captains Noah and John Gomes of the Santa Rosa.

PORPOISE/TUNA PROGRAM

Report on Progress of Research on Porpoise Mortality Completed

During the past year, the Southwest Fisheries Center's La Jolla Laboratory, has conducted extensive research on the problem of incidental mortality of marine mammals in connection with tuna purse seine operations in the eastern tropical Pacific. The research program has concentrated on three main objectives: 1) research and testing various fishing methods and gear technology to reduce the porpoise kill, 2) evaluating the status of porpoise stocks involved in this kill, and 3) monitoring of the incidental porpoise kill throughout the year.

A document entitled, "Progress of research on porpoise mortality incidental to tuna purse seine fishing for fiscal year 1976" was completed on September 7, by Mr. John T. Everett, Leader of the Porpoise/Tuna Interaction Program at the La Jolla Laboratory, describing the present status of the program.

Based on two successful gear research cruises in 1975, made possible through an allocation from the Inter-American Tropical Tuna Commission of 1,000 tons of yellowfin tuna, a large 20-vessel test was mounted in the spring and summer of 1976. The purpose of the test was to evaluate whether an extensive area of small mesh (1-1/4" stretched mesh) porpoise safety panel in the backdown area or a trapezoidal-shaped piece of small mesh webbing (apron) attached between the panel and the corkline were primarily responsible for the low porpoise mortality observed on both cruises. Thus, the test consisted of 10 vessels with extensive areas of small mesh and 10 with the same apron as on the more successful of the two cruises. Results obtained with the experiment to date are very encouraging, according to Mr. Everett.

In addition to the fine mesh and apron concepts, also tested at various times in the past have been the use of speedboats to prevent the corkline from coming together (i.e., net collapse), the use of a device shaped like a shepherd's crook (called a porpoise grabber) to manually rescue trapped porpoise, the use of small rubber rafts in manual removal of porpoise during and after backdown, a "zipper system" to separate porpoise and tuna with a vertical wall of web in the backdown area, current indicator ribbons designed to indicate current dynamics, and the use of a large-volume tapered net designed to safely contain the porpoise and tuna.

The large volume net results were inconclusive due to very little fishing on porpoise by the vessel using it. Work on the current ribbon and zipper concepts mentioned last year have been suspended because of poor results. The porpoise grabber and rafts appear useful, but have not yet been fully evaluated. The use of speedboats to hold the net open is very successful in preventing net collapse. A contract has recently been made with the University of Hawaii to study the chemosensory abilities of yellowfin tina, particularly as applied to the porpoise/tuna problem and preparations are being made for large-scale aircraft and vessel surveys and tagging study.

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Mr. Ray Sauer, Procurement Officer, NASO, Seattle, was at the La Jolla Laboratory September 30-October 1 to conduct negotiations with the owner of the San Diego-based tuna seiner, Elizabeth C. J. for a research cruise charter by the Center during October-November 1976. This cruise will combine tests of fishing gear and observations of propoise behavior. The NOAA research vessel David Starr Jordan, is also scheduled to participate in this cruise. A final contract is being prepared but agreement has not yet been reached on filming to be conducted during the cruise.

TIBURON LABORATORY

COASTAL FISH COMMUNITIES INVESTIGATIONS

Catalina Kelp Forest Completes Growth Cycle

During a visit to the Catalina study area this month, Dr. Edmund Hobson, Leader of the Kelp Forest Communities Task at the Tiburon Laboratory, found that a forest of giant kelp (Macrocystis pyrifera) that has been the site of much study has been replaced by a field of low benthic algae (primary Dictyopteris zonaroides). Thus, the area has returned to the state it was in during the fall of 1972, when study at this location began. The forest became established during the summer of 1973, with a heavy settling of young Macrocystis, and by late summer, 1973, a dense forest had become established. As the kelp plants grew to the surface (in 15 m of water), forming a dense canopy, the sea floor quickly became barren of low algae--the normal condition in a well developed forest.

The transition from field to forest had been monitored, and for the next 2 years the flora and fauna in the forest were periodically assessed along a transect line. Now the forest is gone, and the habitat has returned to its earlier state. A detailed assessment of the current situation is planned for November, which will complete a record of the changes the fishes and other organisms have experienced as the habitat has undergone this dramatic transition.

Work Progresses on Design of Rockfish Survey

During this month, Dr. William Lenarz, Leader of the Rockfish Analysis Task at the Tiburon Laboratory along with Fishery Biologist Peter Adams and Dr. D. Kimura of the Washington Department of Fisheries, wrote segments of the simulation model to be used for studying the alternative designs of the 1977 Coastwide Rockfish Survey. Data from the Monterey pilot survey should become available by October 1, and the investigators hope to make production runs of the model by November.

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Dr. Lenarz spent much of his time this month preparing a Task Development Plan for the expanded Rockfish Analysis Task. The plan, which is to provide information needed for extended jurisdiction responsibilities, has been sent to the Center Director for review.

PHYSIOLOGY INVESTIGATION

Additional Modifications Made to Sea Water System

Additional tests and modifications were made on an apparatus designed by Mr. Tom Yocom, Fishery Biologist and Mr. Jeff O'Neill, Biological Technician at the Tiburon Laboratory, to saturate sea water with the total water-soluble fraction (WSF) of crude oil. Samples of sea water passing through crude oil in the apparatus were collected several times a day for a week and were analyzed spectrophotometrically. Optical densities of samples were determined at 221 nm.

Results of these analyses indicated that concentrations of WSF were stable for the first 6 days--no new crude oil was added to the apparatus during the 1-week test period. After 6 days, the concentration began to drop. Results also indicated that the concentrations of WSF in the samples were uniformly high. Optical densities of 0.35 to 0.45 were achieved during the first 6 days; optical densities in excess of 0.2 are reported to indicate a high mix (or high concentration) of WSF.

Additional analyses made using gas chromatography showed that the relative concentrations of low-boiling-point monoaromatic hydrocarbons were stable during the 1-week test period. The relative concentrations were stable even when the total concentration of WSF began to drop. However, the maximum amount of sea water that could be treated in the solubilizing apparatus was only about 100 ml/min. Modifications made subsequently have increased the flow to more than 1500 ml/min. Such modification was necessary to provide enough WSF-saturated sea water to expose large numbers of animals. Final analyses and modifications are scheduled to be completed by October 1.

A number of avenues were investigated this month in efforts to obtain a supply of Cook Inlet crude oil for analysis. Dr. Douglas Wolfe of ERL, Boulder, is attempting to supply samples to the Tiburon Laboratory, but could not guarantee delivery before December.

Dr. Stan Rice at the NMFS Auke Bay Laboratory agreed to supply 110 gallons of Cook Inlet crude oil but there will be a 6 to 8 week delay in its arrival at Tiburon.

A detailed schedule for all preliminary work needed prior to actual experimentation was presented by Mr. Yocom to other members of the oil task on September 15. According to the schedule, experimentation will begin in mid-October. All task members were asked to provide written reports of their scheduled progress to Dr. Whipple bi-weekly.

The initial biological experiments were outlined in detail this month and were presented to the Tiburon Laboratory Research Council during a task review of the oil project. In addition, Mr. Pete Benville, Chemist, has outlined the procedures for water and tissue analysis to be conducted during the food-chain experiments and acute-toxicity tests. These procedures were sent to prominent chemists working on oil-related research for verification.

Sources of Early Mortality Investigated in Striped Bass Program

Laboratory work on specimens subsampled during this year's experiments on striped bass continued at Tiburon. Considerable effort was spent to locate and eliminate the source of high variation in calorie content determinations (coefficient of variation ranging as high as 22%). The variation seemed to be a function of sample size; larger tissue samples exhibited lower variability. Energy budgets for embryos of two experiments are nearly finished. Eggs were artificially fertilized from two different sets of parents at two different, widely spaced times.

Although the eggs weighed nearly the same (0.270 vs. 0.276 mg dry weight) their caloric content differed considerably, 3.20 vs. 2.15 cals. per egg. An examination of the oil content of the two egg types showed that the high energy eggs contained a larger amount of oil, 56.8% of total egg weight vs. 38.0%. The oil content was determined through micro-analysis by a freon extraction method used to determine fat content in adult fishes. This difference in the amount of oil in the eggs agrees with observations of variation in field-caught eggs and larvae on both east and west coast fishes.

The green pigment in striped bass eggs has been identified by Dr. Welton Lee of the California Academy of Sciences as being a carotenoprotein. Dr. Lee is doing further work on the identification and characteristics of this pigment. The green form of the pigment apparently develops on exposure to the external environment. Eggs in the center of the ovary, for example, are yellow in color while eggs on the outside of the ovary are green. These eggs are otherwise in a similar stage of maturation. The formation of the green carotenoprotein complex is apparently induced by oxidation, or change in temperature or light or some interaction of those factors. Once formed, it is an extremely stable complex when compared to other types of carotenoproteins which have been studied. Dr. Whipple and Dr. Lee are preparing an experimental plan for the study of this pigment, to determine its functional significance and to attempt to determine the manner in which its formation enhances egg and larval survival subsequent to spawning.

Striped Bass Conceptual Model Committee Reconvenes to Finalize Model

The Striped Bass Conceptual Model Committee reconvened on September 8 to finalize the prototype model of sources of mortality in all life stages of striped bass in the San Francisco Bay-Delta systems. Dr. J. Whipple presented hypotheses on sources of mortality during the egg and larval stages, based on preliminary results from this year's laboratory experiments. The hypotheses were discussed and input provided from the California Department of Fish and Game's experience with field data. Committee members finalized a schedule for completion of the model and its presentation at a general meeting, tentatively set for late January.

COASTAL FISHERIES INVESTIGATIONS

Commercial Fishermen and Processors Observe Fishery Operations on Jordan Cruise

Mr. Sus Kato and Lt. Ed Gullekson, Tiburon Laboratory, returned from Cruise 76-07 (105) of David Starr Jordan. The 12-day cruise started at Tiburon and ended at San Diego. A total of 38 researchers, fishermen and processors participated in the cruise. The primary objective of the cruise was to explore the feasibility of trawling in deep waters between Morro Bay and Santa Barbara. Other activities included trapping for shrimp and fish, and hook-and-line fishing for rockfish.

Trawling in deep water (200-700 fm) produced marketable-sized sablefish, dover sole and channel rockfish. The catch per hour was not high enough, however, to be of immediate commercial interest. Notable catches of other species included fair amounts of split-nose rockfish; large blackgill rockfish; large grenadiers; rare vampire octopuses; and possibly a new species of cat shark. The recorded maximum depth range of several species was exceeded. The most memorable catch was a wrecked airplane off San Diego.

Trapping produced only a few rockfish, sablefish, eelpout, shrimp and octopus. Although the catch was disappointing, two fishermen volunteered to conduct further tests with NMFS gear.

The cruise offered an excellent opportunity for an exchange of ideas among researchers, fishermen, processors, Sea Grant marine advisors, and personnel from California Department of Fish and Game.

Silver Salmon Rearing Project Further Delayed

Mr. Roger Green, Leader, Recreational Fisheries Improvement Task at the Tiburon Laboratory, reported that further difficulties with the disease, furunculosis, at the California Department of Fish and Game's Mad River hatchery have delayed delivery of silver salmon for salt water rearing at Tiburon. In view of the renewed outbreak of furunculosis, heavy mortalities, and lowered growth rates, it is doubtful that the salmon would reach smolting stage this year. Other sources of fish are being sought.

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Mr. Green reported that tag returns from last fall's release now number 58. These fish are showing up in increasing numbers at the rearing site. In the last 2-week period this month 26 of them were caught on sport tackle at or near the pen rearing site.

Mr. Larry Green, Northwest Field Editor, Field and Stream magazine, is visiting the Tiburon Laboratory. He plans to spend 2 or 3 weeks fishing and gathering information for an article on the silver salmon project.

Mr. Green participated during 1 week on the Jordan cruise gathering data for the fishing methods subtask. Timed fishing was conducted with four rods, two types of line, and two types of terminal gear to determine differences in efficiency. Approximately 400 rockfish were caught.

Printing of Anglers' Guide to the U.S. Pacific Coast Delayed

During the month, NMFS' Scientific Publications Office in Seattle informed Ms. Susan Smith at the Tiburon Laboratory that there would be a delay in getting the whole package of corrected galleys and layout of the Guide to the printer in Klamath Falls, Oregon. This means that the Guide will not make it to the presses in early fall as expected; however, there is a chance that it will go to press before January 1.

The Anglers' Guide, co-authored by Fishery Biologist Jim Squire at the La Jolla Laboratory, and Susan Smith at Tiburon, describes marine game fish, fishing grounds, and angler facilities along the coasts of California, Oregon, Washington, Alaska, Hawaii, American Samoa and Guam.

PRESS RELEASE

September 27 - NMFS, NOS Open House features tour of research vessel Cromwell

PUBLIC RELATIONS

NOAA's Sixth Anniversary Celebrated at Open House Aboard Research Vessel David Starr Jordan

Photograph by Ken Raymond, La Jolla Laboratory

Shown above are some of the estimated 1,600 visitors who toured the NOAA research vessel, David Starr Jordan, on September 23 during Open House held to celebrate NOAA's Sixth Anniversary. Hosts for the event which was held at the Broadway Pier in San Diego were the staff of the Southwest Fisheries Center, the Southwest Region, Terminal Island, and the National Oceanographic Data Center.

In the foreground are Ms. Anita Coit and Ms. Penny Soderberg of the La Jolla Laboratory who helped answer questions and distributed information on NOAA activities. The exhibits, on the ship and at dockside, prepared by Scientific Illustrator Ken Raymond and his staff, attracted favorable comment from the crowd of school children, senior citizens, and tourists.

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Many staff members of the Honolulu Laboratory were involved in making preparations for the Laboratory's participation in the National Ocean Survey (NOS) and National Marine Fisheries Service (NMFS) Open House held from September 30 to October 2. Mr. Heeny Yuen, Fishery Biologist was in charge of the event.

The National Oceanic and Atmospheric Administration (NOAA) research vessel Townsend Cromwell was opened to the public by NOS and the Laboratory put up various displays on current research. The Open House which was held at the Kewalo Research Facility was in observation of the sixth anniversary of NOAA. A total of 815 students and 25 teachers representing 12 educational institutions (elementary school to colleges) visited the facilities on Thursday and Friday (September 30 and October 1) and 444 people toured the exhibits on Saturday (October 2).

HONORS AND AWARDS

NMFS Publications Policy Board Makes Awards

The NMFS Publications Policy Board has selected recipients of NMFS Publication Awards for 1975.

Receiving Honorable Mention recognition in the Marine Fisheries Review category was Mr. Tamio Otsu of the Honolulu Laboratory for his paper entitled, "Japan Fisheries, 1975," which appeared in the November 1975 issue (Vol. 37, No. 11).

Dr. Reuben Lasker of the La Jolla Laboratory received Honorable Mention recognition for his paper, "Field criteria for survival of anchovy larvae: The relation between inshore chlorophyll maximum layers and successful first feeding," published in the Fishery Bulletin, Vol. 73, No. 3.

The authors will receive certificates and letters of congratulations from NMFS Director Robert Schoning.

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On September 7, Mr. R. Shomura, Director of the Honolulu Laboratory, called a general staff meeting to present:

1) Mr. Melvin Dutro with a 35-year service pin;
2) Mr. Bernard Ito with a 15-year service pin; and
3) Mr. Heeny Yuen with a quality step increase.

MEETINGS AND TRAVEL

NMFS is Host at 27th Tuna Conference

Chaired by Dr. Dan Huppert, Economist at the La Jolla Laboratory, substituting for Dr. William Fox who was called to testify at a hearing in Washington, the 27th Tuna Conference was held in Lake Arrowhead, California, September 26-29, 1976. Among the scientists discussing models and tuna fisheries at the conference were the following members of the Southwest Fisheries Center staff:

Dr. Roy Mendelssohn, Honolulu Laboratory, "Optimum harvesting strategies for stochastic populations."

Dr. William Lenarz, Tiburon Laboratory, "A theoretical examination of some aspects of the interaction between longline and surface fisheries of tuna."

Mr. Paul Greenblatt, La Jolla Laboratory, "Factors affecting purse seine fishing effort."

Dr. Daniel Huppert, "Systems model of the major surface tuna fisheries."

The second day of the conference focused on environmental factors and fishing effort. The moderator was Dr. R. Michael Laurs of the La Jolla Laboratory who started off the proceedings with an overview and followed with a talk on "Recent physiological and biochemical studies on albacore." Other SWFC scientists participating in this symposium were:

Mr. Richard Evans, La Jolla Laboratory, "Recent empirical research on environmental determinants of tuna catch."

Dr. Huppert, "A dynamic programming approach to evaluation of environmental information for fisheries management.

Also attending from the SWFC were Messrs. D. Au, A. Coan, J. Coe, P. Greenblatt, and B. Wahlen.

Southwest Fisheries Center

August 26 -
September 29 - Dr. William Perrin, La Jolla Laboratory, traveled to Bergen, Norway to attend a marine mammal conference sponsored by FAO of the United Nations. He subsequently visited Moscow and Leningrad state museums to work with their Delphinus collections from the Black Sea and the North Pacific, and to catalog other cetacean holdings for future reference.

September 2 - Mr. Shomura and Dr. Wetherall, Honolulu Laboratory, called a meeting at the Laboratory to obtain input and comments from recreational fishing industry members knowledgeable about billfishes.

- Dr. Hiroshi Yamauchi of the Tropical Agriculture Department, University of Hawaii, discussed with Mr. Shomura details of a bioeconomic study of Pacific billfishes that NMFS wishes to conduct by contract.

7 - Dr. Jeannette Whipple, Tiburon Laboratory, attended a Steering Committee meeting held by San Francisco State University to organize a workshop for determination of baseline studies to be conducted off central and northern California in connection with the OCSEAP program. The Workshop will be held at at San Francisco State University from October 22 through October 25.

6-23 - Dr. Lasker, Leader of the Coastal Fisheries Resources Division at the La Jolla Laboratory, was invited to the Institute of Marine Research in Bergen, Norway to present some of his latest findings in stock and recruitment and to assist the marine scientists at the Institute in establishing a larval fish program. Following this, he attended the Joint Oceanographic Assembly in Edinburgh where he presented two symposium papers. The first was on the distribution of larval fish food and its relation to survival of anchovy larvae, and the second, given at the Symposium on Ocean Variability, was a review of the work in progress on ocean variability and its biological effects along the West Coast of the United States and Canada. Following the Assembly, Dr. Lasker was invited to lecture at the Institute of Marine Biochemistry in Aberdeen, where he discussed the current research at the Southwest Fisheries Center and its potential application to North Sea problems.

8-9 - Mr. Shomura attended the Pacific Tuna Development Foundation Board meetings.

8-17 - Acting Center Director, I. Barrett traveled to Washington, D.C. to attend the National Conference for Regional Fishery Management Councils and a Regional/Center Director's meeting.

9 - Mr. Shomura departed Honolulu for the Tiburon Laboratory to observe first-hand (Sept. 10-11) the status of the bait-transport project; on Sept. 12 he proceeded to Washington, D.C. to attent the National Conference for Regional Fisheries Management Council (Sept. 13-17).

September 11-18 - Mr. John Everett, La Jolla Laboratory, traveled to Honolulu to review the chemosensory contract with the University of Hawaii and to familiarize himself with the Honolulu Laboratory and staff.

13-16 - Mr. J. Squire, La Jolla Laboratory, traveled to Helena, Montana to attend the annual meeting of the International Association of Natural Resource Pilots.

17 - Mr. Tony Chess, Fishery Biologist, Tiburon Laboratory, traveled to Santa Barbara to participate in a meeting of the Taxonomic Standardization Program.

18-19 - Mr. Roger Green and Mr. Mickey Eldridge represented the Tiburon Laboratory on an ecology cruise sponsored by the Sierra Club.

19-22 - Dr. Dan Huppert, Economist at the La Jolla Laboratory traveled to Detroit, Michigan to present a paper which he wrote with Drs. W. Fox and G. Sakagawa, "Tropical tuna fisheries: a systems simulation approach to management strategy," at the Annual National Meeting of the American Fisheries Society. Dr. Sakagawa and Dr. J. Powers were also present at the meetings.

Dr. Sakagawa also attended the International Association of Fish and Conservation Commissioners meeting in Detroit.

20 - Mr. William M. Wolf (of the Internal Revenue Service) met with Mr. Shomura and Mrs. Mary Lynne Godfrey to discuss the Combined Federal Campaign.

21-25 - Planning Officer David Mackett visited the Honolulu Laboratory where he consulted on planning for the Northwest Hawaiian Island Survey.

22 - Mr. Shomura attended portions of the morning session of the EEO Seminar, "Focus on Understanding." He spent the rest of the day with Mr. David Mackett, who arrived from La Jolla to discuss the Northwestern Hawaiian Islands program.

23-24 - Mr. Shomura and Mrs. Godfrey attended the 2-day EEO Conference for Managers at the Ala Moana Hotel, Gardenia Room.

25-26 - Administrative Assistant Anita Coit of the La Jolla Laboratory attended the Fourth Western Regional Conference of Federally Employed Women, Inc. (FEW) held in San Diego, CA.

September 26-30 - Dr. W. Fox, Leader of the Oceanic Fisheries Resources Division, traveled to Washington, D.C. to participate in Congressional Oversight hearings at the request of Director Schoning.

September 26 - October 2 - Acting Center Director Barrett in Pago Pago, American Samoa, to review federal aid program there and subsequently to meet with Admiral Taylor of the National Ocean Survey in Honolulu.

September 27 - October 1 - Dr. G. Sakagawa in Atlanta, Georgia to attend a Department of Commerce Advanced Management Seminar.

29 - Dr. P. Smith in Ensenada, Mexico to report on research to the Instituto Nacional de Pesca Symposium.

30 - Dr. Reuben Lasker in Ensenada, Mexico to present a paper at the IND symposium.

September 29 - October 1 - Messrs. L. Eber, K. Bliss, R. Lynn, and M. Laurs at Lake Arrowhead, California to attend EPOC meeting.

VISITORS

Honolulu Laboratory

September 8 - Mr. Victor Susanto, Director, Directorate of Resources Management, Directorate-General of Fisheries, Department of Agriculture, Jakarta, Indonesia, spent some time with Mr. Shomura.

9 - Messrs. Veravat Hongskul and Kachornsak Wetchagarun, both of the Department of Fisheries, Thailand. (They were in Honolulu attending an East-West Center meeting.)

14 - Mr. John Everett of SWFC, La Jolla visited the Laboratory; he spent some time with Dr. Andrew Dizon, Leader of the Experimental Ecology of Tunas group.

17 - Messrs. Ian Richardson and David Insull, both of Fisheries Development, London, England.

23 - Mr. Toganivalu, Minister of Agriculture, Fisheries and Forestry, Government of Fiji, was taken on a tour through the fish markets, our Kewalo Research Facility area, etc. by Mr. Uchiyama.

La Jolla Laboratory

September 13 - Mr. Kenneth R. Hollingshead, National Marine Fisheries Service, Washington, D.C.

20-21 - Mr. Jim Johnson, NMFS Pacific Environmental Group, Monterey, CA. Mr. Johnson is the newly-appointed Fishery Attache to Japan, and will leave his post as leader of the PEG Group to assume his new duties in mid-October.

22-24 - Ms. Barbara Keith, NMFS International Negotiations Division, Washington, D.C.

23 - Mr. Robert N. Tasto, California Department of Fish and Game, Menlo Park, CA.

29 - Captain Charles K. Townsend, NOAA Pacific Marine Center, Seattle, Washington.

Tiburon Laboratory

September 1 - Jolin Lessin, D.V.M., Larkspur, CA.

16 - Stan Gallagher, San Francisco State University, S.F., CA.

William M. Conner, Conner Associates, Concord, CA.

21 - Al Ramirez, Control Data Corp., San Francisco, CA.

Kevin Friel, University of San Francisco, San Francisco, CA.

22 - John Norton and Joe Cech, University of California at Davis, Davis, CA

Hiram Li, Dept. of Wildlife and Fisheries, University of California at Davis, Davis, CA

23 - Margaret Bradbury, San Francisco State University, S.F., CA

Judy Anaderio, Bayside School, Sausalito, CA.

27 - Raymond Johansson, Northgate Office Equipment Co., San Rafael, CA.

N. Matsuki, Matsubara Co., Tokyo, Japan

28 - Larry Green, Field and Stream magazine, San Bruno, CA

PERSONNEL

Mr. Shomura is presently in the process of assigning Mrs. Mary Lynne Godfrey as the Honolulu Laboratory's permanent Administrative Officer.

Training

An all-day EEO seminar, "Focus on Understanding," a program on race relations, was attended by almost the entire Honolulu Laboratory staff on September 22. The seminar was presented by Mr. Domingo Reyes and Ms. Joan Dendinger of the NOAA Central Office in Rockville, Maryland.

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On September 1, seventeen employees of the La Jolla Laboratory took part in a special workshop in San Diego in recognition of Women's Equality Day and Hispanic Week. The event, sponsored by the Federal Equal Employment Opportunity Council of San Diego and Imperial Counties, was designed to assist Federal activities to meet requirements in their local and national affirmative action plans which mandate special programs in observance of these two events. Attending the Workshop were: Anita Coit, Selective Placement and Placement for Vietnam-Era Veterans Coordinator; Elaine Sandknop, Federal Women's Program Coordinator; Henry Orr, the Laboratory's Spanish-Speaking Programs Coordinator; Gary Stauffer, Gail Theilacker, K. Dorsey, John Mac Gregor, Larry Eber, Roger Leong, Pete Paloma, Ruth Miller, Michael Laurs, James Thrailkill, Barbara Engstrand, Dorothy Roll, and Eric Barham.

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September 7	Barbara Sumida, Fishery Biologist, Appointment (PT)	La Jolla	Laboratory	
9	Stephen Reilly, Biological Technician, Termination	"	"	"
13	Julie Dickson, Clerk-Stenographer, Temporary Appointment	"	"	"
27	Bruce Wahlen, Statistician, Promotion	"	"	"

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DEPARTMENT OF COMMERCE

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